

Michigan Technical Academy High School  
Roof Replacement

## INVITATION TO BID

**Project:** Michigan Technical Academy High School Roof Replacement

**Location:** Michigan Technical Academy High School  
23750 Elmira Avenue  
Redford Township, MI 48239

**Due Date:** Friday, October 31, 2008 at 2pm at the above location (GYMNASIUM)

**Site Visit:** Wednesday, October 22, 2008 at 9am at the above location

**Owner:** Michigan Technical Academy Board of Directors  
23750 Elmira Avenue  
Redford Township, MI 48239

**Construction Manager:** The Garrison Company  
32871 Middlebelt Road  
Suite 100  
Farmington Hills, MI 48334

**SEALED** bids will be received by **THE OWNER** until the deadline. Any bids received after that deadline will be deemed late and not opened or considered. Proposals received will be publicly opened and read aloud the same day. All bidders are invited to attend the bid opening.

No proposal may be withdrawn for a period of sixty (60) days after submission. Bids offering less than sixty (60) days for acceptance by THE OWNER from the date set for opening may be considered non-responsive and will be rejected.

THE OWNER reserves the right to reject any or all Bids and to waive irregularities or informalities as may be deemed in Owner's interest. It is THE OWNER's intent to award the project to the lowest responsive and responsible bidder for the total Bid for all phases of construction work for each building or for all buildings as deemed in the best interest of THE OWNER.

The successful bidder(s) will be required to furnish performance, and labor and material payment bonds in amount equal to one hundred percent (100%) of the contract amount for contracts over \$50,000. The surety on such bonds shall be a duly authorized company satisfactory to THE OWNER.

Contracts for work under the bidder's bid will obligate the bidder and all subcontractor(s) (i) not to discriminate in employment practices based on race, color, sex, religion, natural origin or age in compliance with the President's Executive Order 11246, and (ii) to take affirmative action to ensure that applicants and employees are treated during employment without regard to these factors.

Each proposal shall contain four (4) copies of the proposal and shall be submitted at the specified location and time and shall be enclosed in a sealed envelope plainly marked **MICHIGAN TECHNICAL ACADEMY HIGH SCHOOL ROOF REPLACEMENT**.

**NO PHONE, FAX or E-MAIL BIDS WILL BE ACCEPTED!**

All inquiries should be directed to **The Garrison Company – Attention Christian Verardi** by fax at (248) 932-9106 or by e-mail at [cverardi@garrisoncompany.com](mailto:cverardi@garrisoncompany.com). Please be advised all inquiries must be received no later than **OCTOBER 29, 2008**.

**This project is required to be a “prevailing wage” project. It remains the responsibility of the Contractor to secure quality labor and to familiarize themselves with published wage rate information.**

This project is a part of a public school academy. The Contractor must maintain full compliance with Revised School Code Section MCLA 380.1267, Contractor's Bond for Public Buildings or Works MCLA 129.201, and the Prevailing Wages on State Projects Act MCLA 408.551.

DOCUMENT 00310 – BID FORM

FOR: **MICHIGAN TECHNICAL ACADEMY – REDFORD, MI**

DIVISION: Roofing Replacement

DATE: \_\_\_\_\_

NAME OF BIDDER: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

TELEPHONE: (\_\_\_\_) \_\_\_\_\_

FACSIMILE: (\_\_\_\_) \_\_\_\_\_

E-MAIL: \_\_\_\_\_

TO: **MICHIGAN TECHNICAL ACADEMY BOARD OF DIRECTORS**

BASE BID:

Bidder agrees to perform all work as described in the Contract Documents, for Lump Sum of

\_\_\_\_\_ (\$\_\_\_\_\_).

VOLUNTARY ALTERNATES TO BASE BID:

The Bidder offers the following Voluntary Alternates to the Base Bid. The following Voluntary Alternates shall be expressed in words and figures as Add or Deduct to Base Bid as indicated. (Refer to section 01030).

UNIT PRICES:

If the following items of work are added or deducted from quantities required by the construction documents, unit prices will apply as stated.

(Show amounts in both words and figures. In case of discrepancy, amount shown in words will govern).

	<u>ADD</u>	<u>DEDUCT</u>
Price No. 1: <b>DESCRIPTION OF WORK</b>	\$_____/C.Y.	\$_____/C.Y.
Price No. 2: <b>DESCRIPTION OF WORK</b>	\$_____/C.Y.	\$_____/C.Y.

FEES FOR CHANGES IN WORK

The undersigned agrees that if awarded the contract for this work, upon request by THE OWNER, perform additional work or omit specified work, or cause same to be performed or omitted by contractors, for the following percentage fees which have been computed in accordance with the requirements of Section 01154:

Work by Contractor's Own Forces **10%**

### PROPOSED SUBSTITUTIONS

The undersigned submits for consideration by THE OWNER and/or the Architect-Engineer the Proposed Substitutions as listed hereinafter, each item being offered as a substitute for the referenced specified item which was used in compiling the Lump Sum Price of this Proposal and each price having been computed in accordance with the requirements of Section 00440.

<u>Proposal Item</u>	<u>Proposed Substitution</u>	<u>Add</u>	<u>Deduct</u>
1. _____	_____	\$ _____	\$ _____
2. _____	_____	\$ _____	\$ _____
3. _____	_____	\$ _____	\$ _____
4. _____	_____	\$ _____	\$ _____

The bidder agrees that THE OWNER may accept or reject any or all of the above Proposed Substitutions, and that the work applicable to any items which are accepted will be performed in accordance with the requirements of the drawings and specifications.

The bidder understands that THE OWNER reserves the right to reject any or all Bid/Tenders and to waive any informalities or irregularities herein.

Upon notice of acceptance of this Bid, the bidder will execute Contract Agreement and deliver properly executed Performance and Payment Bonds to Owner within 15 days.

### ADDRESS, LEGAL STATUS, AND SIGNATURE OF BIDDER

The undersigned does hereby designate the address, given below, as the legal address to which all notices, directions, or other communications may be served or mailed.

P.O. Box (if applicable) \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

The undersigned does hereby declare that is has the legal status checked below.

\_\_\_\_\_ Individual  
\_\_\_\_\_ Co-Partnership filed in \_\_\_\_\_ County, \_\_\_\_\_  
\_\_\_\_\_ Corporation Incorporated under the laws of the State of \_\_\_\_\_  
\_\_\_\_\_ Limited Liability Company organized under the laws of the State of \_\_\_\_\_

The names and addresses of all persons indicated as principals in this Bid are as follows;

<u>NAME</u>	<u>ADDRESS</u>
_____	_____
_____	_____
_____	_____
_____	_____

This bid is submitted in the name of:

\_\_\_\_\_  
(Name of Contractor)

By \_\_\_\_\_

Title \_\_\_\_\_

INSTRUCTIONS: Four (4) copies of this form are supplied for the use of Bidders. Submit three (3) copies to Owner and retain one (1) copy.

END OF SECTION 00310

BID FORM

00310-4

10/24/08

Michigan Technical Academy High School  
Roof replacement

## **ADDENDUM #1: SCOPE OF WORK**

The following information is being provided to clarify the work requirements of the captioned project.

### **Roof Area A:**

Remove 35'x29' of existing rubber membrane roofing, existing poly iso deck insulation (+/-2.5"), and metal roof deck. The existing bar joists shall remain.

Install new metal roof deck to match the existing deck, 2.5" of new rigid poly iso deck insulation, and new roof membrane. Coordinate with plumbing trade for the installation of new roof sump.

### **Roof Area C:**

Remove 12'x 90' of existing rubber membrane roofing, and existing poly iso deck insulation (+/-2.5").

Install 2.5" of new rigid poly iso deck insulation, and new roof membrane.

### **Roof Area E:**

Remove 27'x 16' of existing rubber membrane roofing, and existing poly iso deck insulation (+/-2.5") at the west end of this roof area.

Install 2.5" of new rigid poly iso deck insulation, and new roof membrane. Taper the insulation to existing roof sump in the southwest corner.

### **Roof Area M:**

Remove 56'x 23' of existing standing seam sloped roofing, the existing vertical fascia shall remain. Remove the existing fiberboard and OSB underlayment, and existing poly iso deck insulation (+/-2.5").

Install 2.5" of new rigid poly iso deck insulation, new roof membrane, 2.5" of pressure treated blocking and 6" aluminum coping along perimeter.

### **Roof Area M:**

Remove 132'x 29' of existing standing seam sloped roofing, the existing vertical fascia shall remain. Remove the existing fiberboard and OSB underlayment, and existing poly iso deck insulation (+/-2.5").

Install 2.5" of new rigid poly iso deck insulation, new roof membrane, 2.5" of pressure treated blocking and 6" aluminum coping along perimeter.

## **SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

##### **A. Invitation to Bid**

#### **1.2 SUMMARY**

##### **A. Section Includes:**

1. Mechanically fastened EPDM membrane roofing system.
2. Roof insulation.
3. Roof flashings, terminations and accessories.

#### **1.4 PERFORMANCE REQUIREMENTS**

**A. General Performance:** Installed membrane roofing, base flashings and copings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

**B. Material Compatibility:** Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

**C. Not used**

#### **1.5 SUBMITTALS**

**A. Product Data:** For each type of product indicated.

**B. Shop Drawings:** For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

**C. Qualification Data:** For qualified Installer and manufacturer.

**D. Manufacturer Certificate:** Signed by roofing manufacturer certifying that membrane roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of complying with performance requirements.

**E. Product Test Reports:** Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.

**F. Research/Evaluation Reports:** For components of membrane roofing system, from the ICC-ES.

**G. Field quality-control reports.**

**H. Maintenance Data:** For membrane roofing system to include in maintenance manuals.

**I. Warranties:** Sample of special warranties.

#### **1.6 QUALITY ASSURANCE**

**A. Manufacturer Qualifications:** A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.

**B. Installer Qualifications:** A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

C. **Source Limitations:** Obtain components including roof insulation, insulation fasteners for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.

D. **Exterior Fire-Test Exposure:** ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

E. **PreInstallation Roofing Conference:** Conduct conference at Project site.

1. Meet with Owner, and Construction Manager, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

#### 1.8 PROJECT CONDITIONS

A. **Weather Limitations:** Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Examine all areas and conditions affecting performance of roofing system. No extras will be allowed due to conditions that should have been foreseen or observed by the contractor.



C. Coordinate schedule of work with the teaching staff as to when work will begin and end.

### 1.9 WARRANTY

A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of membrane roofing system.

2. Warranty Period: 15 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, and vapor retarder products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

## PART 2 – PRODUCTS

### 2.1 EPDM MEMBRANE ROOFING

A. EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Carlisle SynTec Incorporated.
- b. Firestone Building Products.
- c. GAF Materials Corporation.
- d. GenFlex Roofing Systems.
- e. Johns Manville.
- f. Versico Incorporated.

2. Thickness: 60 mils , nominal.

3. Exposed Face Color: Black.

### 2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

B. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.

C. Bonding Adhesive: Manufacturer's standard.

D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch wide minimum, butyl splice tape with release film.

E. Lap Sealant: Manufacturer's standard, single-component sealant.

F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.

I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM

securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

### 2.3 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of  $\frac{1}{4}$  inch per 12 inches unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes for sloping to drain. Fabricate to slopes indicated.

### 2.4 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

## PART 3 - EXECUTION

### 3.1 ROOFING REMOVAL AND DEMO

- A. Examine all areas and conditions affecting performance of roofing system. No extras will be allowed due to conditions that should have been foreseen or observed by the contractor.
- B. Coordinate schedule of work with the teaching staff as to when work will begin and end.
- C. Remove all vegetation currently growing in the area of new work.

### 3.2 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Identify any substrate in poor condition and in need of replacement. Establish the extent and tabulate the quantity with the construction manager and owner.
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on

adjoining roofing.

### 3.3 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush

and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints

staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

H. Install cover boards over insulation with long joints in continuous straight lines with end

joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.

1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

### 3.4 MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

A. Place membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of membrane roofing where required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.

F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.

H. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

I. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

J. Install membrane roofing and auxiliary materials to tie in to existing membrane roofing to maintain weather-tightness of transition and to not void warranty for existing membrane roofing system.

### 3.5 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

### 3.7 PROTECTING AND CLEANING

A. Protect new and existing membrane roofing system from damage and wear during construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.



## DETROIT ROOFING INSPECTION SERVICE

3560 East Nine Mile Road • Suite 100 • Warren, Michigan 48091-2382

January 23, 2008

Michigan Technical Academy  
23750 Elmira  
Redford, MI 48239

Re: Roof Condition Survey  
Location: Michigan Technical Academy  
23750 Elmira  
Redford, MI 48239

In response to your request, we have completed an evaluation of the roofing system at the above referenced site. Our inspection involved a thorough visual inspection of the roofing and flashing system as well as tests to determine construction of the system.

The following report is a summary of our findings, including photographs of deficient areas, a roof plan and recommendations regarding repair/replacement. This report does not include new portion of the building in the northwest corner.

### GENERAL DESCRIPTION

The building at this location is a normal masonry and steel type structure with both metal and wood roof decks. There is a total of approximately 41,000 sq. ft. of roof surface over multiple roof areas and elevations. There are normal penetrations through the roof for plumbing ventilators and equipment curbs.

At the present time, waterproofing consists of a single ply, EPDM membrane over the majority of the roof areas and metal standing seam roof panels over various steep sloped sections. The EPDM membrane attachment varies by location and consists of fully adhered, mechanically attached and a combination of fully adhered with mechanical attachment.

Evidence of standing water was found over many of the roof areas and this appears to remain for several days in some locations. Delaminating field seams and patches were noted within these locations which are caused by standing water and age.

We noted that the wood support blocks for the service lines are not set on walk pads or slip sheets to protect the membrane. The small AC units located on the roof are positioned on pavers; however, they are not on slip sheets or walk pad. This allows the edges of the supports to press into the membrane which causes damage or punctures from expansion and contraction of the supports.

Light vegetation was noted in the various corners and around the AC unit on Area I. This vegetation can begin to open seams in the flashings and membrane causing entry points for moisture.

Small holes were noted in the membrane on the south side of Area B near the transition to Area C. We noted a large split in the membrane on the north side of Area K. This open membrane was allowing moisture into the building. We repaired this split with materials we had on site during our test cut analysis.

### DRAINAGE SYSTEM

Elimination of accumulated moisture over the roof areas is accomplished through interior type roof sumps along with gutters and downspouts.

Roof sumps located over the building are constructed with both lower quality PVC materials and high quality cast bowls and clamping rings. We noted a missing drain strainer basket on Area H and a broken strainer basket on the drain in Area I.

Several of the drains appear to be blocked by natural debris or are higher than the roof surface which restricts drainage. Ponding water conditions were noted over several areas with the most severe conditions located over Areas A, C and H. EPDM flashings and field seams exposed to ponding water deteriorate at an accelerated rate. This causes delamination of the seams and flashings. This condition was noted in several locations over all roof areas.

### TEST CUT ANALYSIS

Small test cores were performed at random locations to determine construction of the roofing systems. These areas were then repaired using compatible materials.

Our test indicates the following materials at the test cut locations:

#### TEST CUT Area A

Mechanically Attached EPDM  
2.5" Rigid Foam Insulation  
Metal Decking

#### TEST CUT Area B

Fully Adhered EPDM  
2.5" Rigid Foam Insulation  
Metal Deck

TEST CUT Areas C & D

Mechanically Attached EPDM  
2.25" Rigid Foam Insulation  
Base Sheet  
Metal Decking

TEST CUT Area F

Fully Adhered EPDM  
1.5" Rigid Foam Insulation  
Wood Decking

TEST CUT Area H

Mechanically Attached EPDM  
2.5" Rigid Foam Insulation  
Base Sheet  
Metal Decking

TEST CUT Area K

Mechanically Attached EPDM  
2.5" Rigid Foam Insulation  
Base Sheet  
Wood Deck

TEST CUT Areas E & I

Fully Adhered EPDM  
2.25" Rigid Foam Insulation  
Base Sheet  
Wood Deck

TEST CUT Area G

Mechanically Attached EPDM  
2.5" Rigid Foam Insulation  
Metal Deck

TEST CUT Area J

Mechanically Attached EPDM  
1.5" Rigid Foam Insulation  
Metal Deck

BASE FLASHING/SHEET METAL

Over the various roof areas several metal flashings are in place. These consist of metal copings on the top of parapet walls, fascia metal on the perimeter of flush roof areas, counter flashings along the top of the base flashings on vertical walls and metal closures on the metal roof areas.

On the roof we found joints in the copings which were open to the weather. This will allow moisture to gain access to the building. In addition we noted that fasteners were installed through the tops of the copings which can allow moisture to pool and enter the flashing. We noted raised fasteners and fasteners that are not sealed along the top of the coping in several locations including the east side of Area J.

Gutter supports are starting to pull up on the membrane due to stress and damage to the gutters. This has caused the flashing to separate from the supports and create openings along the eave edge. This is noted along the eave edge on Areas G & K.

Where gutters are not present gravel stop edges are in place. We noted in several locations that the gravel stop joints have separated and created openings where moisture can gain access under the membrane. Over time this will cause splits in the membrane.

The top edge of the counter flashing on the south end of area B is open to the weather. We also found that the base flashing at the corner between Area B and the east side of Area D is open along the vertical edge. This was also found on the west side of Area B at the vertical transition to the metal roof area.

Base flashings along the vertical wall on Area C are open to the weather in several locations. We noted that the base flashings are open along the top edge of the membrane near the north end of Area C. We also noted a base flashing seam on the north side of the HVI/AC unit on the west end of Area E which was open to the weather.

### GENERAL CONDITION

Overall the roofing on this building varies from fair to poor condition. Roofing over Areas B & F appears to be newer and with repairs and regular maintenance can provide additional years of service. However, roofing over Areas A, C, D, E, G, H, I, J & K are showing signs of age and deterioration. Over these areas field seams and flashings are delaminating allowing moisture to enter the roof. Poor drainage is increasing the likelihood of leaks in these open areas and drainage should be corrected during roof replacement.

### RECOMMENDATION

Based on our visual inspection and testing, it is our opinion that roofing on this building is in need of repair and replacement. Some of these repairs range from securing existing perimeter metal flashings and cutting out membrane wrinkles on Area B, to sealing metal flashings and completing minor maintenance on base flashings and field seams on Area F.

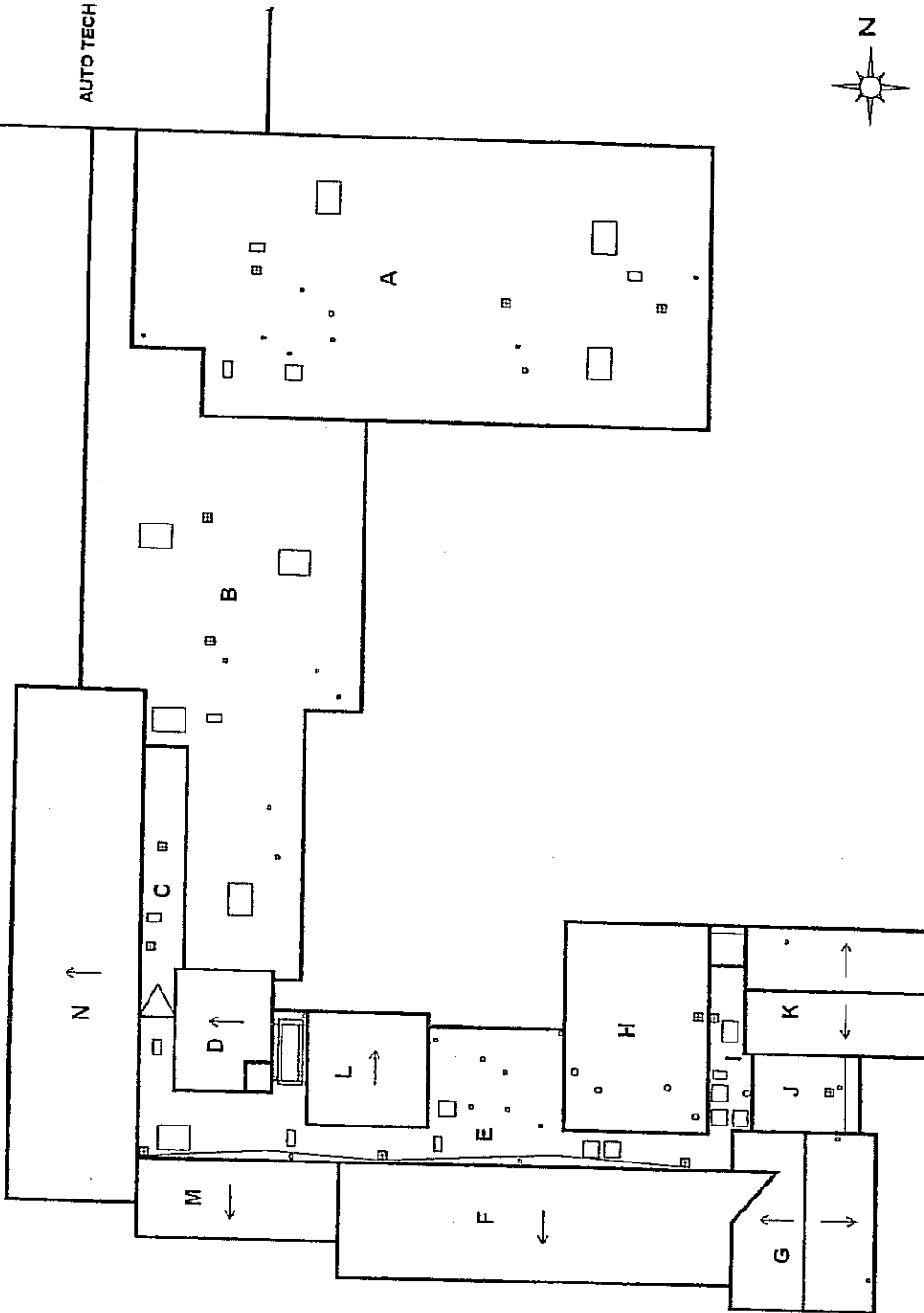
{ Over Areas A, C, D, E, G, H, I, J & K we recommend that removal and replacement be scheduled within the next 12 -18 months. It may be possible to remove the existing membrane and salvage the roof insulation if replacement is completed as soon as possible. An infrared scan would need to be completed over the roof to determine if moisture is trapped below the membrane. If minor areas only are detected, then these locations can be replaced and the remainder of the insulation can remain in place.



We do recommend that tapered insulation be installed over much of the roof to increase positive slope for drainage. This will reduce or eliminate the ponding water over the areas and in return will increase the service life of the new roof system.

It should also be noted that the metal roofs over Areas L, M & N are in fair to poor condition. Multiple repairs have been made over the panels with sections of modified or roll roofing. Over these repairs and roof panels a elastomeric coating has been applied to seal the panels. We estimate that replacement of these roofs will be necessary within the next 18-24 months.

AUTO TECH CENTER



MICHIGAN TECHNICAL ACADEMY  
23750 ELMIRA, REDFORD, MI 48239

DETROIT ROOFING INSPECTION SERVICE, INC.  
3090 E. NINE MILE RD. SUITE 100, WARREN, MI 48091 (888) 708-2143

SHEET NUMBER 1

DRAWN BY:  
J C

ROOF PLAN

DRIS JOB NO : 76345-08  
DRAWING DATE : 1-11-08

